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Release 2012/09/13 : AL SLIP 13 January 1961  
CIA-RDP78-03535A000500070094-5

OC-E/R&D Lab		ATTN:		STAT
ROOM NO.	BUILDING			
REMARKS:				
<p>This morning [ ] came to STAT me and said, "Would you please return this to the Lab?" Well ----- it has taken 6 years and 8 months to get to you but here it is.</p> <p>A Lab Subject Copy that is marked "PLEASE RETURN TO ENGINEERING DIVISION" can u beat that? See how honest we can be?</p>				
FROM:				
OC-T/CTB		June		
ROOM NO.	BUILDING	EXTENSION		

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Release 2012/09/13 : PLACES FORM 36-8 ☆ GPO : 1957 - O - 439445  
CIA-RDP78-03535A000500070094-5

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Anne 2512

Chief, Operations &amp; Training Division, OC

16 May 1956

Chief, Engineering Division, OC

PLEASE RETURN TO  
ENGINEERING DIVISION  
Reference No.

Transistorised Converter, CV-1

ENG-6-562

1. This memorandum summarizes the work recently completed on the transistorised converter project. The discussion includes the defects noted in the two units returned for repair, the modification which permits safer operation with AC-DC type receivers, and the characteristics of the two solar batteries recently forwarded for use with the unit. Instructions and photographs which cover the modification are attached. Precautions suggested for addition to field instructions are also included.

2. Two converter units were returned to the Laboratory for repair. One of these units had suffered slight damage during evaluation for use with AC-DC receivers. Attachment #1 discusses this difficulty. The second unit was repaired by replacing the oscillator transistor. It is noted that the Laboratory is now aware of three failures involving the oscillator transistor. This fact prompted an attempt to establish a failure trend on the oscillator circuit. The units were operated continuously for extended periods, and connections were made in varying sequence without failure. It is believed possible, however, that the cause of this failure is associated with transients occurring during connection. To minimize this possibility, precautionary measures are listed in Attachment #2 as suggested additions to field instructions.

3. The difficulty encountered in using the converter with AC-DC receivers has been removed by the minor modification described in Attachment #2. Three units were so modified by the Laboratory. The components required for field modification of the remaining nine units have been forwarded. Photographs and instructions are included in Attachment #2.

4. During the above modification an error was noted in the original converter schematic. In the oscillator circuit, the top end of the 47 K resistor and the bottom end of crystal socket 802 should show connected to the transistor base. This error has been corrected on the schematics which form a part of Attachment #2.

5. Two solar batteries capable of operating the converter have been completed. These units were forwarded on 14 May. Photographs and characteristics appear in Attachment #3.

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NO CHANGE IN CLASS. ☐  
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NEXT REVIEW DATE: \_\_\_\_\_  
AUTH: HR 70-2  
DATE: 4 DEC 1964 540

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6. The completion of the work discussed above fulfills current laboratory commitments on the converter project.



25X1

Attachments (3)

*R&D NCP*  
R&D/Lab/NCP/rkb (16 May 1956)

Distribution:

- Original and 1 - Addressee
- 1 - Lab Subj. Copy ✓
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- 1 - OC-E Chrono
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## Attachment #1

Memorandum: Chief, OC-E to Chief, O&amp;T dated 16 May 1956

Subject: Transistorized Converter, CV-1

16 May 1956

## REPAIRS ON CONVERTER AND AC-DC RECEIVER

This attachment discusses the failure which occurred in the converter and the AC-DC receiver during evaluation. The receiver, RCA Model 4X648, was inoperative upon return to the Laboratory for the following reasons:

- (a) Loop antenna disconnected
- (b) Secondary of IF transformer open
- (c) Cathode bias resistor in RF stage open
- (d) Cathode bias resistor in IF stage open

The bias and AVC connections to the receiver RF stage are made through the loop antenna. Removal of the loop, in order to connect the converter, removed the bias on the first stage. The cathode bias resistor burned out. The reason for the open IF transformer is not fully understood; however, when it opened, the bias on the IF amplifier was removed which burned out the cathode resistor. The converter used with the receiver during this test was damaged to the following extent:

- (a) Burned out secondary of transformer T<sub>2</sub>
- (b) Oscillator transistor inoperative

The receiver and converter have been repaired and readjusted.

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## Attachment #2

Memorandum: Chief, OG-E to Chief, O&amp;T dated 16 May 1956

Subject: Transistorized Converter, CV-1

16 May 1956

**MODIFICATION OF CV-1 CONVERTER FOR USE WITH AC-DC RECEIVERS**

1. In the unmodified converter, one side of the output transformer  $T_2$  is connected to chassis ground. In use, this connection is extended to the receiver which ties the two chassis together. If an earth ground is desirable or required at the converter input, the receiver chassis is also grounded to earth which is unacceptable in the case of AC-DC receivers.
2. The modification consists of isolating the secondary of transformer  $T_2$  from the converter chassis by inserting a 0.005 uf capacitor in series with the transformer lead to chassis ground. The physical location of this capacitor is shown in Figure #1.
3. A procedure for making the modification is outlined below.  
**PRECAUTION:** A low wattage soldering iron should be used and a heat sink applied to the emitter lead of the oscillator transistor. Water saturated pipe cleaners, paper toweling and the like can be used as a satisfactory heat sink.

**Modification Procedure**

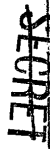
- (a) Remove crystal.
- (b) Remove nylon chassis from case. It is not necessary to disconnect the negative battery lead.
- (c) Disconnect the braided shield and the low end of the secondary of transformer  $T_2$  from the ground bus.
- (d) Place a 0.005 uf ceramic capacitor in the vacant area below the tuning capacitor. (See Figure #1 and the attached schematic)
- (e) Remove the 3/8" 4-40 screw and replace with a 1/4" screw if it interferes with the positioning of the capacitor.
- (f) Dress leads so that connections are flush with bottom of chassis. It may be necessary to insulate with a small piece of tape at the transformer-capacitor connection.
- (g) Check the modification by measuring the DC resistance across the secondary of  $T_2$  and from the secondary to chassis ground. The secondary of  $T_2$  should read approximately 2.5 ohms. The secondary of  $T_2$  to chassis ground should read infinity. Repeat these checks upon reassembly.
- (h) The converter can now be operated with the chassis at earth potential and the braid shield connected directly to the receiver chassis.

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4. It is recommended that the following procedures be observed in the operation of the converter.
  - (a) Never connect the converter to a receiver, or attempt to disassemble the unit, while the crystal is in place.
  - (b) Remove the receiver power plug from the mains until all connections to the converter and the receiver have been completed.

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NOTE 1 - SWITCH S<sub>1</sub> IS ACTUATED BY CRYSTAL CASE S02  
NOTE 2 - E<sub>bb</sub>: 1.34 VOLT MALLORY MERCURY CELL TYPE RM-401R OR  
STANDARD FLASHLIGHT CELL.  
NOTE 3 - CAPACITOR VALUES ARE IN  $\mu\text{fd}$  UNLESS SPECIFIED.  
NOTE 4 - ALL RESISTORS ARE 1/8 WATT.  
NOTE 5 - L<sub>1</sub> 50 $\mu\text{h}$  33ma RF CHOKE NATIONAL R-33.

TRANSFORMER T2

1/8" →

9/32"

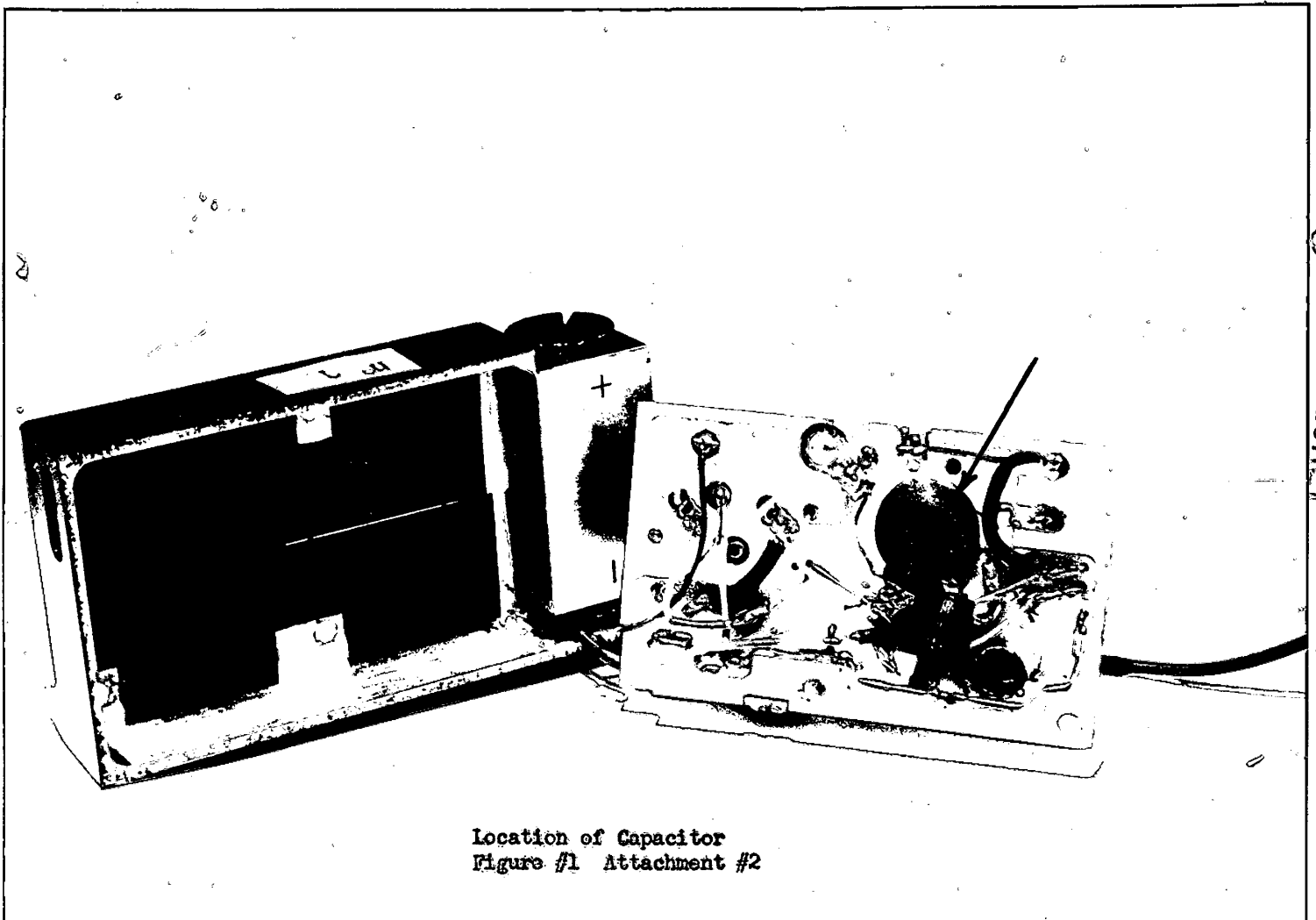
1/2" APPROX.

(NOTE - SKETCH IS 2 TIMES SCALE)

SOURCE - LABORATORY CONSTRUCTION.  
CORE - STACKPOLE TYPE G2.  
PRIMARY - 15 TURNS, #38, DOUBLE SILK ENAMEL  
(OUTER COIL).  
SECONDARY - 67 TURNS (APPROX.)\*, #38 ENAMEL  
(INNER COIL).  
\* ADJUSTED TO RESONATE AT 3 MCS WITH 60 $\mu$ fd ON  
BOONTON Q-METER TYPE 260A.  
WINDING - LAYER.

TRANSISTORIZED  
RF CONVERTER (CV-1)  
16 DECEMBER 1955

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Attachment #3

Memorandum: Chief, OC-E to Chief, O&T dated 16 May 1956

Subject: Transistorized Converter, CV-1

16 May 1956

SOLAR BATTERIES FOR CV-1 CONVERTER

1. This attachment forwards the photographs and technical data for the two solar batteries delivered on 14 May. Included are representative voltage-current-power relations versus load, and photographs showing three views of the packaged unit.
2. The basic cell used in this battery is a type S-1 silicon solar cell manufactured by National Fabricated Products, 2650 West Belden Avenue, Chicago, Illinois. The cell has been split into four wedge shaped segments, wired in series, and repackaged in the original case by the manufacturer. It is sealed in silicon oil. Based on current estimates, the manufacturer can supply this battery on two weeks delivery at a unit cost of \$22.50.
3. The power-versus-load curves are shown by Figures 1A and 1B. Figures 2A and 2B indicate the current-voltage relations as a function of load. The curves are plotted on an expanded scale for loads above 1000 ohms. Figures 3, 4, and 5 show the packaged battery in three orientations.

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K+E KEUFFEL & ESSER CO. MADE IN U.S.A.  
3 CYCLES X 70 DIVISIONS

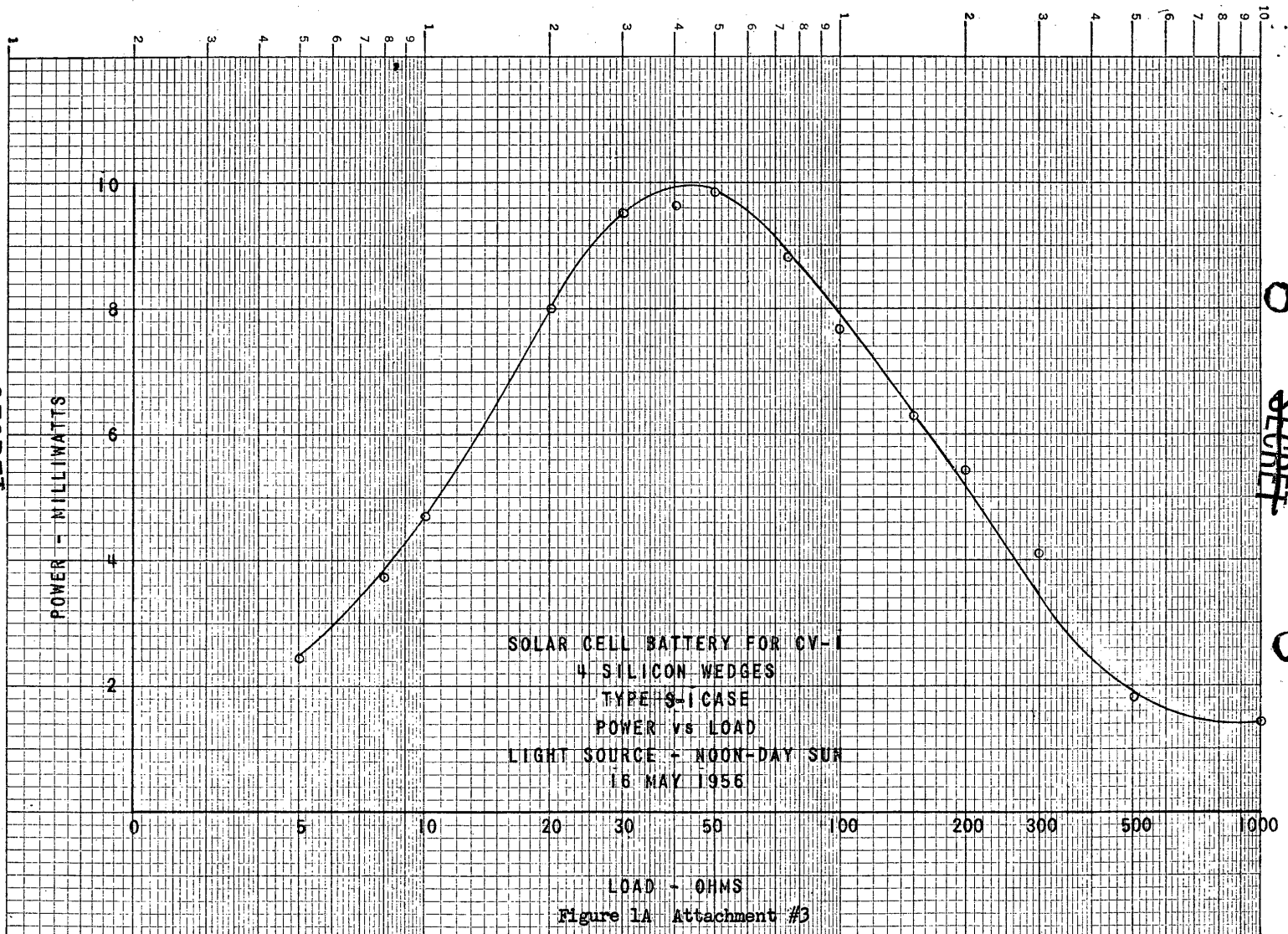


Figure 1A Attachment #3

SOLAR CELL BATTERY FOR CV-1  
4 SILICON WEDGES  
TYPES-I CASE  
POWER vs LOAD  
LIGHT SOURCE - NOON-DAY SUN  
16 MAY 1956

POWER - MILLIWATTS

2

1

0

1000

2000

3000

4000

5000

6000

7000

8000

LOAD - OHMS

Figure 1B Attachment #3

KEUFFEL & ESSER CO. MADE IN U.S.A.  
3 CYCLES X 70 DIVISIONS

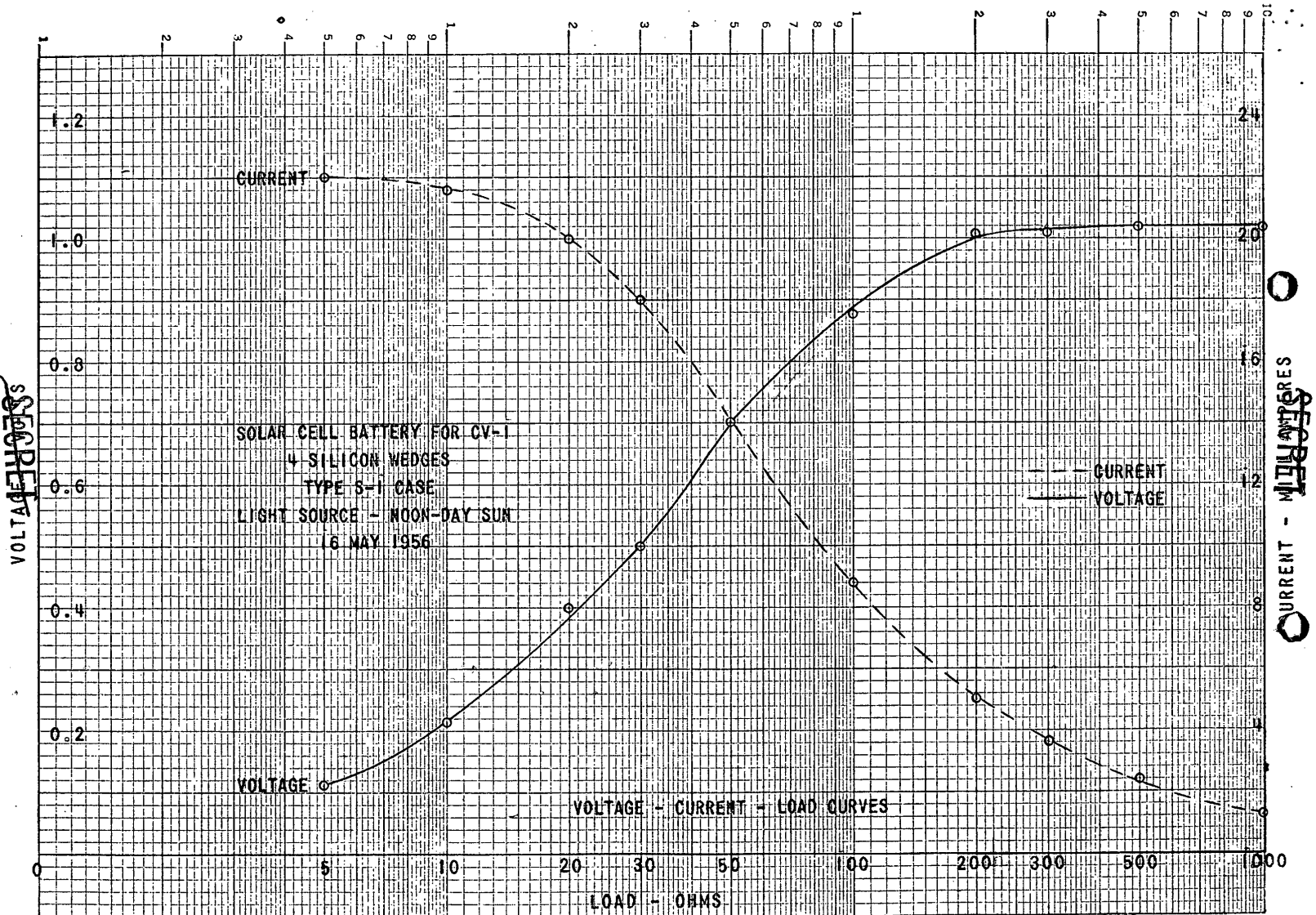
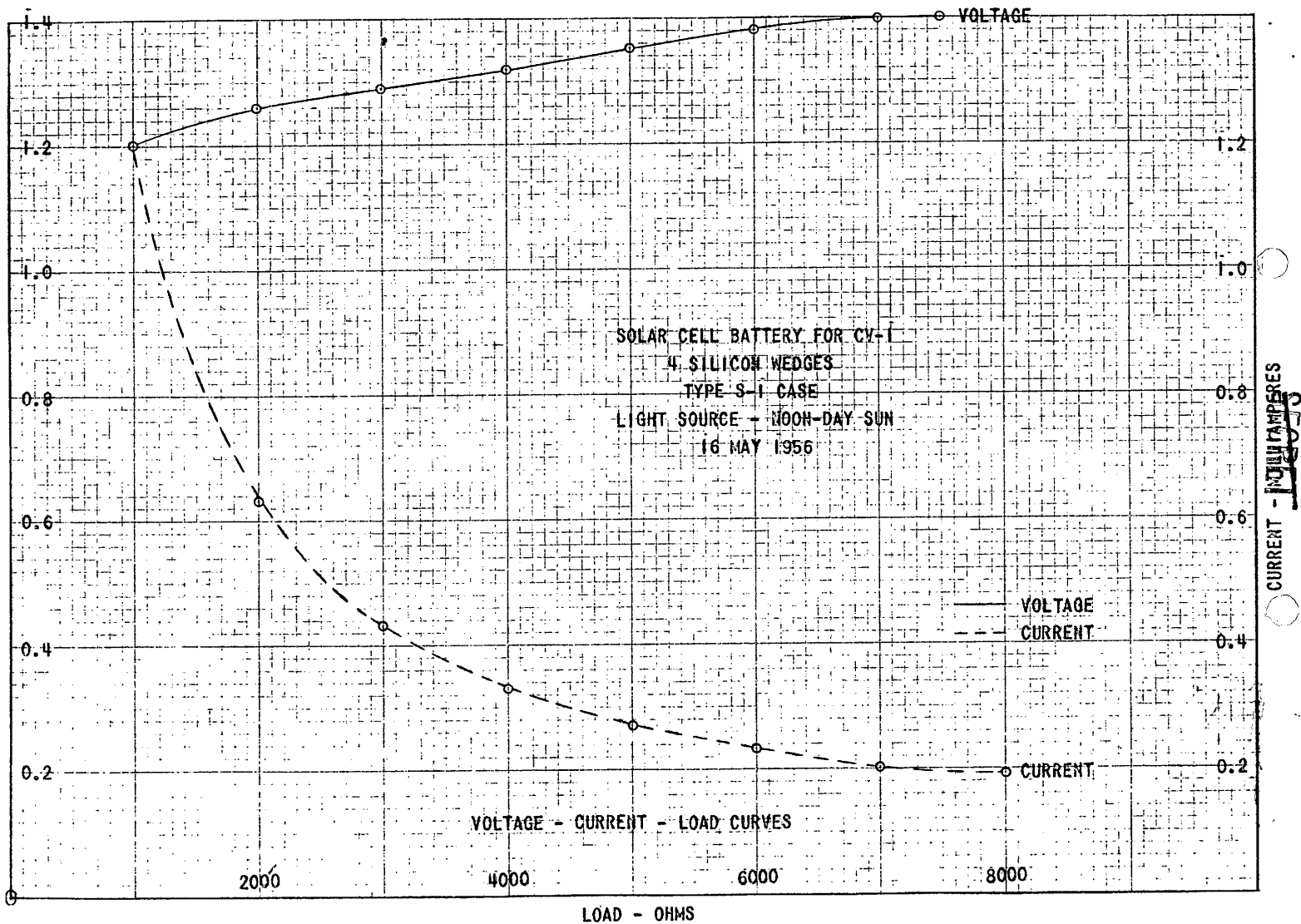
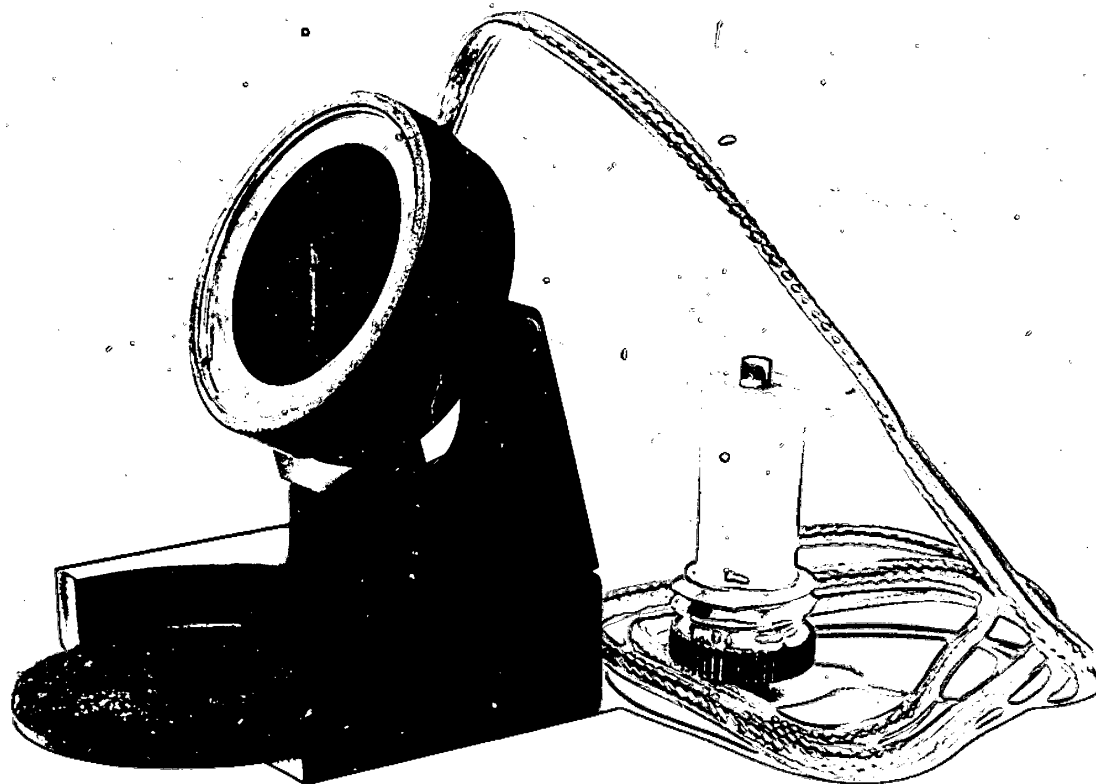


Figure 2A Attachment #3

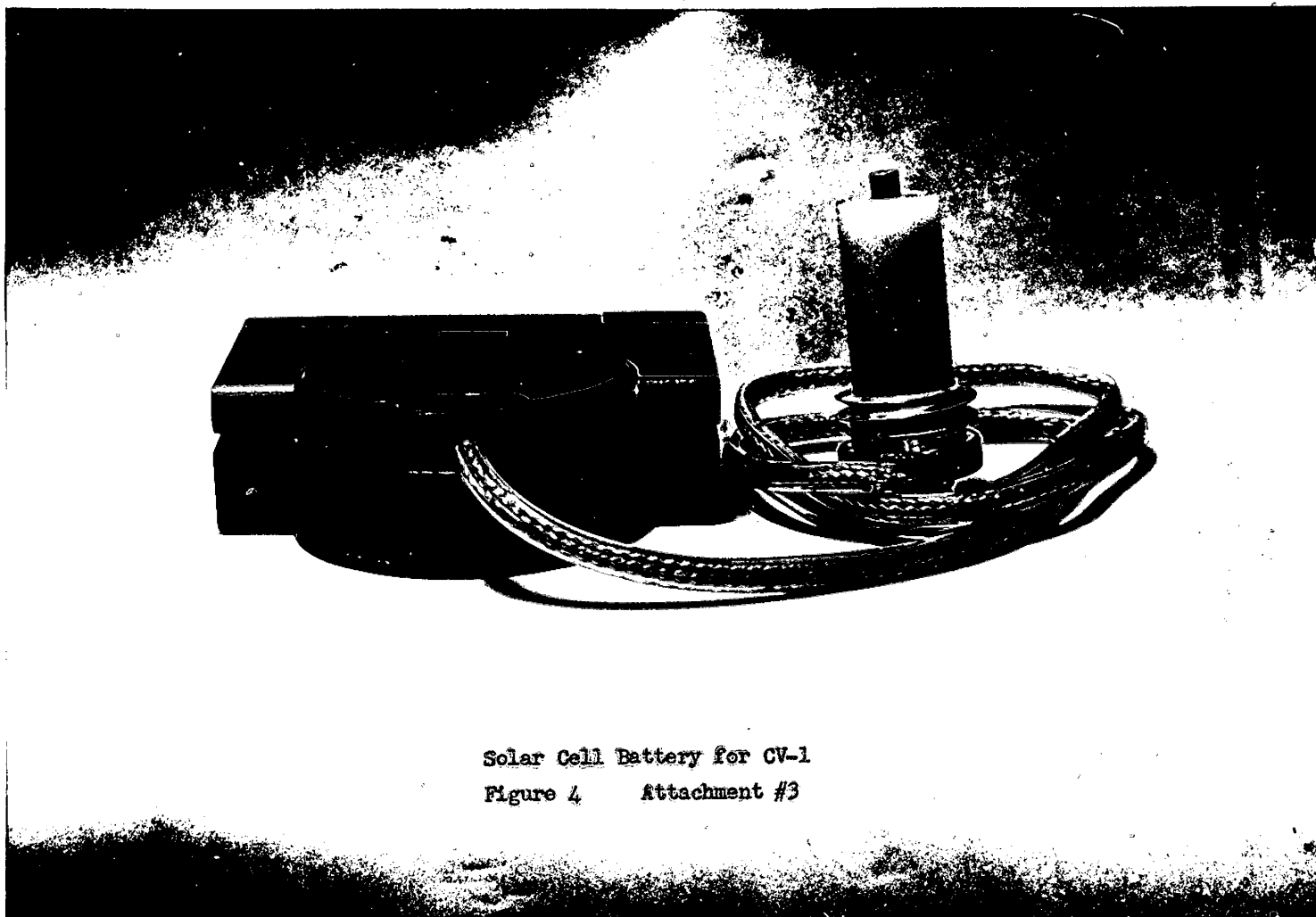
KEUFFEL & ESSER CO. MADE IN U.S.A.





Solar Cell Battery for CV-1  
Figure 3 Attachment #3

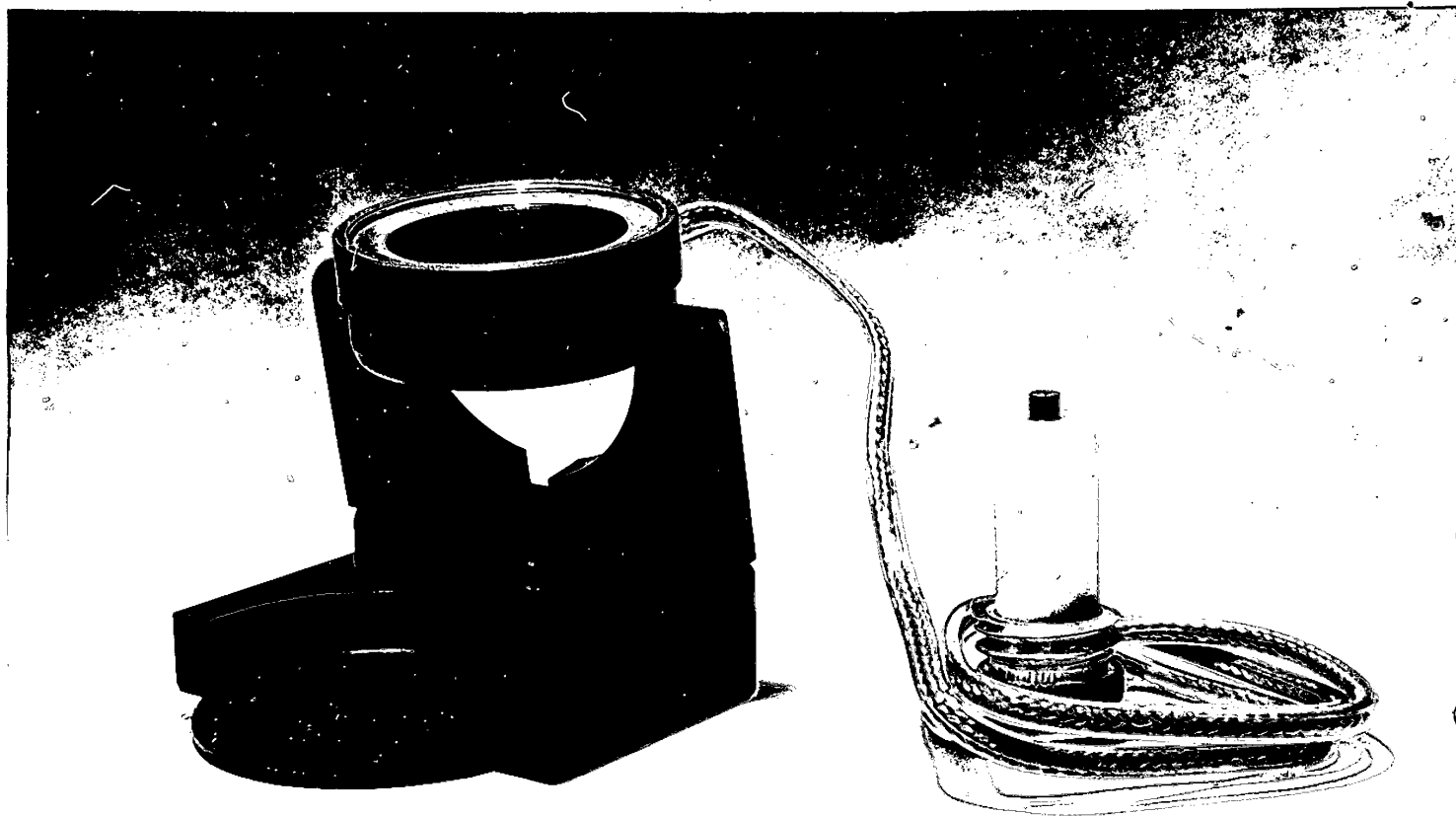
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Solar Cell Battery for CV-1  
Figure 4 Attachment #3

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Solar Cell Battery for CV-1  
Figure 5 Attachment #3

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